UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,879	01/17/2002	John E Stewart	55875.00007	6136

7590 11/02/2005	EXAMINER
Squire Sanders & Dempsey	THANGAVELU, KANDASAMY
801 South Figueroa Street 14th Floor	
Los Angeles, CA 90017-5554	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		09/914,879	STEWART, JOHN E
		Examiner	Art Unit
		Kandasamy Thangavelu	2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2002*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 January 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-15 of the application have been examined.

Drawings

2.   The drawings submitted on January 17, 2002 are objected to.

Figure 1 of the drawings uses the term, "reduce the subset of curvature". The specification does not describe the subset of curvature, it only describes the subset of curvature measures. It is also not understood as to what is meant by reducing the subset of curvature. Figure 1 also uses the term, "coefficient of regression". The specification does not describe the coefficient of regression, but only the coefficient of correlation. It is not clear what the applicant meant by the coefficient of regression. Is it same as the coefficient of correlation? The figure also uses the term "coefficient of regession". This is incorrect.

The applicants are required to identify each block in the flow chart of Fig. 1 with a block identifier, so it will be possible to identify the block while discussing it.

Specification

3.   The disclosure is objected to because of the following informalities:

Page 6, Line 1, "quadratic polynomial that accurate approximates the local surface shape" appears to be incorrect and it appears that it should be "quadratic polynomial that accurately approximates the local surface shape".

Page 8, Lines 13-14, "In many instances, derivation from one of these shapes is strongly correlated with disease" appears to be incorrect and it appears that it should be "In many instances, deviation from one of these shapes is strongly correlated with disease".

Page 11, Lines 22-23, "This ration should be zero for cylinder" appears to be incorrect and it appears that it should be "This ratio should be zero for cylinder".

Page 11, Lines 25-26, "This value should be 0 for spheres and planes and 0 otherwise" appears to be incorrect and it appears that it should be "This value should be 0 for spheres and planes and non-zero otherwise".

Page 12, Lines 5-6, "For convex surfaces, 200 will be parallel to the axia of a cylinder" appears to be incorrect and it appears that it should be "For convex surfaces, 200 will be parallel to the axis of a cylinder".

Page 12, Lines 11-13, "The average of the dot product between the second principal curvature vector at the center platelet vertex 201 and those vertices immediately connected to this vertex is calculated" appears to be incorrect and it appears that it should be "The average of the dot product between the second principal curvature vector at the center platelet vertex 201 and the second principal curvature vectors of those vertices immediately connected to this vertex is calculated".

Page 12, Lines 13-14, "For convex surfaces, v_2 will be perpendicular to the axia of a cylinder" appears to be incorrect and it appears that it should be "For convex surfaces, v_2 will be perpendicular to the axis of a cylinder".

Page 13, Lines 3-4, "Figure 5 illustrates the characteristic of the normal triangle for a cylindrical surface" appears to be incorrect and it appears that it should be "Figure 4 illustrates the characteristic of the normal triangle for a cylindrical surface".

Page 15, Lines 20-21, "this magnitude will appear in both th enumerator and denominator" appears to be incorrect and it appears that it should be "this magnitude will appear in both the numerator and denominator".

Page 17, Lines 11-13, "Differentiating the above equation with respect to each of the regression coefficients results in the ma   trix" appears to be incorrect and it appears that it should be "Differentiating the above equation with respect to each of the regression coefficients results in the matrix".

Page 18, Lines 3-4, "The aneurysm patient group was contained nine females and two males" appears to be incorrect and it appears that it should be "The aneurysm patient group contained nine females and two males".

Page 20, Line 8, "where r2 is the coefficient of determination" appears to be incorrect and it appears that it should be "where r^2 is the coefficient of determination".

Page 21, Lines 6-7, "partial (β_j) and standardized (β_j^*) correlation coefficient for multiple regression" appears to be incorrect and it appears that it should be "partial (β_j) and standardized (β_j^*) regression coefficient for multiple regression".

Page 23, Lines 7-8, "the independent variable x_j is removed from the left side of

equation 5 and is used in place of y" appears to be incorrect and it appears that it

should be "the independent variable x_j is removed from the right side of equation 10 and

is used in place of y".

Page 23, Line 18, "Table II lists the VIFs for the five classical curvature

measures" appears to be incorrect and it appears that it should be "Table II lists the

VIFs for the four classical curvature measures".

Claim Objections

4.   The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the
> specification and terms and phrases in the claims must find clear support or antecedent basis in
> the description so that the meaning of the terms in the claims may be ascertainable by reference
> to the description.

5.   Claims 1-7, 10, 11 and 13 are objected to because of the following informalities:

Claim 1, Line 1, "A method of evaluating determining three dimensional

structures" appears to be incorrect and it appears that it should be "A method of

evaluating three dimensional structures".

Claim 1, Line 13, "if any variance inflation factor is less than 10, go to step 1"

appears to be incorrect and it appears that it should be "if any variance inflation factor is

less than 10, going to step 1".

Claim 1, Lines 14-15, "sequentially reduce the subset of curvature measures used in multiple linear regression by 1" appears to be incorrect and it appears that it should be "sequentially reducing the number of curvature measures used in multiple linear regression analysis by 1".

Claim 1, Line 16, "performing multiple linear regression on all combination of curvature measures" appears to be incorrect and it appears that it should be "performing multiple linear regression analysis on all combination of curvature measures". See step e) and step k).

Claim 1, Lines 22-23, "into the linear equation generated by multiple linear regression for the curvature subset" appears to be incorrect and it appears that it should be "into the linear equation generated by multiple linear regression analysis for the curvature subset".

Claim 2, Line 7, "the minimum of the absolute value of the two principal curvatures" appears to be incorrect and it appears that it should be "the minimum of the absolute values of the two principal curvatures".

Claim 2, Line 12, "the first principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the first principal curvature vectors of all vertices".

Claim 2, Line 15, "the second principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the second principal curvature vectors of all vertices".

Claim 2, Line 18, "the second principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the second principal curvature vectors of all vertices".

Claim 2, Lines 20-21, "the first principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the first principal curvature vectors of all vertices".

Claim 2, Lines 28-30, "the ratio of the radius or diameter of a circle inscribed into a normal triangle ... and the radius or diameter of a circle circumscribed around a normal triangle" appears to be incorrect and it appears that it should be "the ratio of the radius or diameter of a circle inscribed into a normal triangle ... to the radius or diameter of a circle circumscribed around a normal triangle".

Claim 2, Line 34, "the ratio of the area over perimeter" appears to be incorrect and it appears that it should be "the ratio of the area to perimeter".

Claim 6, Line 12, "if any variance inflation factor is less than 10, go to step 1" appears to be incorrect and it appears that it should be "if any variance inflation factor is less than 10, going to step 1".

Claim 6, Lines 13-14, "sequentially reduce the subset of curvature measures used in multiple linear regression by 1" appears to be incorrect and it appears that it should be "sequentially reducing the number of curvature measures used in multiple linear regression analysis by 1".

Claim 6, Line 15, "performing multiple linear regression on all combination of curvature measures" appears to be incorrect and it appears that it should be "performing multiple linear regression analysis on all combination of curvature measures". See step e) and step k).

Claim 6, Lines 21-22, "into the linear equation generated by multiple linear regression for the curvature subset" appears to be incorrect and it appears that it should be "into the linear equation generated by multiple linear regression analysis for the curvature subset".

Claim 10, Lines 7-8, "the minimum of the absolute value of the first and second principal curvatures" appears to be incorrect and it appears that it should be "the minimum of the absolute values of the first and second principal curvatures".

Claim 10, Line 12, "a first principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the first principal curvature vectors of all vertices".

Claim 10, Line 14-16, "an average of the dot product between a second principal curvature vector of a second surface vertex and a second principal curvature vector of all vertices on a 3D triangulated surface immediately connected to the second surface vertex" appears to be incorrect and it appears that it should be "an average of the dot product between a second principal curvature vector of a surface vertex and the second principal curvature vectors of all vertices on a 3D triangulated surface immediately connected to the surface vertex".

Claim 10, Line 17-22, "a difference between the average of the dot product between the second principal curvature vector of the second surface vertex and the second principal curvature vector of all vertices on the 3D triangulated surface immediately connected to the second surface vertex and the average of the dot product between the first principal curvature vector of the surface vertex and the first principal curvature vector of all vertices on the 3D triangulated surface immediately connected to the surface vertex" appears to be incorrect and it appears that it should be "a difference between the average of the dot product between the second principal curvature vector of the surface vertex and the second principal curvature vectors of all vertices on the 3D triangulated surface immediately connected to the surface vertex and the average of the dot product between the first principal curvature vector of the surface vertex and the first principal curvature vectors of all vertices on the 3D triangulated surface immediately connected to the surface vertex".

Claim 10, Lines 27-30, "a ratio of a radius or a diameter of a circle inscribed into a normal triangle ... and a radius or a diameter of a circle circumscribed around a normal triangle" appears to be incorrect and it appears that it should be "a ratio of a radius or a diameter of a circle inscribed into a normal triangle ... to a radius or a diameter of a circle circumscribed around a normal triangle".

Claim 10, Line 33, "the ratio of the area over perimeter" appears to be incorrect and it appears that it should be "the ratio of the area to perimeter".

Claim 11, Line 8, "forming a shape equation with the plurality of curvature measures;" appears to be incorrect and it appears that it should be "forming a shape equation with the plurality of curvature measures.".

Claim 12, Lines 1-2, "the first set of surface equations are bivariate quadratic equations." appears to be incorrect and it appears that it should be "the first set of surface equations comprises bivariate quadratic equations.".

Claim 13, Lines 7-8, "the minimum of the absolute value of the first and second principal curvatures" appears to be incorrect and it appears that it should be "the minimum of the absolute values of the first and second principal curvatures".

Claim 13, Line 12, "a first principal curvature vector of all vertices" appears to be incorrect and it appears that it should be "the first principal curvature vectors of all vertices".

Claim 13, Line 14-16, "an average of the dot product between a second principal curvature vector of a second surface vertex and a second principal curvature vector of all vertices on a 3D triangulated surface immediately connected to the second surface vertex" appears to be incorrect and it appears that it should be "an average of the dot product between a second principal curvature vector of a surface vertex and the second principal curvature vectors of all vertices on a 3D triangulated surface immediately connected to the surface vertex".

Claim 13, Line 17-22, "a difference between the average of the dot product between the second principal curvature vector of the second surface vertex and the second principal curvature vector of all vertices on the 3D triangulated surface immediately connected to the second surface vertex and the average of the dot product between the first principal curvature vector of the surface vertex and the first principal curvature vector of all vertices on the 3D triangulated surface immediately connected to the surface vertex" appears to be incorrect and it appears that it should be "a difference between the average of the dot product between the second principal curvature vector of the surface vertex and the second principal curvature vectors of all vertices on the 3D triangulated surface immediately connected to the surface vertex and the average of the dot product between the first principal curvature vector of the surface vertex and the first principal curvature vectors of all vertices on the 3D triangulated surface immediately connected to the surface vertex".

Claim 13, Lines 27-30, "a ratio of a radius or a diameter of a circle inscribed into a normal triangle ... and a radius or a diameter of a circle circumscribed around a normal triangle" appears to be incorrect and it appears that it should be "a ratio of a radius or a diameter of a circle inscribed into a normal triangle ... to a radius or a diameter of a circle circumscribed around a normal triangle".

Claim 13, Line 33, "the ratio of the area over perimeter" appears to be incorrect and it appears that it should be "the ratio of the area to perimeter".

Claim 15, Lines 1-2, "the second set of surface equations are bivariate quadratic equations" appears to be incorrect and it appears that it should be "the second set of surface equations comprises bivariate quadratic equations".

Claims objected to but not specifically addressed are objected to based on their dependency to an objected claim.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7.   Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1, Lines 5-7 state "b) identifying a first set of regions on the three dimensional structure or structures and assigning a numeric value to said structure or structures;

c) identifying a second set of regions and assigning a numerical value to said regions;".

The claim and the specification do not state anywhere, what is done with the numeric value of the structure and the numeric value of the regions.

The claim states, on line 11, "to obtain a coefficient of regression for all curvatures for all vertices"; on lines 18-19, "selecting the subset of curvature measures that yields the largest coefficient of regression;"; on lines 20-21, "to obtain a coefficient of regression for said curvature subset;" It is not clear as to what the applicant meant by the coefficient of regression .

The specification describes the coefficient of correlation on Page 19, in Equation 13. It describes the partial coefficients of linear regression in Page 17, with equations 10 and 11. The specification uses the term "regression coefficient" on Page 19, Line 20; "maximum coefficient of regression" on Page 23, Line 28; coefficient of regression on Page 24, Line 3, Line 8 and Lines 9-10; "regression coefficient" on Page 24, Line 14; coefficient of regression on Page 24, Line 22; "regression coefficient" on Page 25 and Page 26 in table II. But nowhere does the specification describe and define the coefficient of regression. The Examiner checked a book of statistics and found the definition for coefficient of regression as, "For simple regression, the coefficient of regression is the slope of the regression line. It is the average number of units of either increase or decrease in the dependent variable that are associated with a one unit increase in the independent variable. A similar interpretation of the coefficients of multiple regression also applies". Therefore multiple regressions have several coefficients of regression.

Claim 1, Lines 16-17 state, "i) performing multiple linear regression on all combinations of curvature measures possible for each subset;"; Lines 20-21 state, "k) performing multiple linear regression analysis on said values determined in d) to obtain a coefficient of regression for

said curvature subset;". It is not clear why the multiple linear regression analysis is performed for all combinations of curvature measures for said curvature subset twice.

Claim 1 states in Lines 22-23, "1) inserting the partial coefficients of linear regression into the linear equation generated by multiple linear regression for said curvature subset.". The equation is Equation 10, on Page 17 of the specification. But the specification does not specify anywhere what the dependent variable y is. Why? Is it a measure of the effective curvature or some other variable? The specification states on Page 17, Lines 16-18, "y_i are the values assigned to the vertices of the 3-D computer models that "teach" multiple linear regression what aneurysms look like". But what are the y_i values? How are the aneurysms taught from the y_i values?

The claim and the specification do not describe anywhere how the y_i values are used or interpreted to determine the three dimensional structures. The specification describes how the individual curvature measures are used to identify a cylinder, a sphere or a plane on Page 11, Lines 22-23; on lines 25-26; on Page 12, Lines 5-10; Lines 14-18; Lines 20-22; Page 15, Lines 4-5; Lines 13-14; Lines 17-19; Page 16, Lines 1-2; Lines 3-5; Lines 7-8; Lines 18-20. However, the use of y_i values to identify the cylinder, sphere or plane is not described in the specification.

Claim 6 has the same set of 112 First Paragraph issues as discussed with reference to claim 1 and is rejected for the same reasons.

Claim 8 states in part, "forming surface equations representative of the local sets of points with the associated vertices; and

ascertaining a plurality of curvature measures for the surface equations to identify a

shape.". The specification does not describe anywhere what the surface equations are and how

they are formed. The specification does not describe anywhere how the three dimensional shape

is determined from the surface equations. What are the rules used to interpret the values of y_i

that are generated to identify the three dimensional shape?

Claim 11 states in part, "forming a first set of surface equations representative of the first

local sets of points with the associated vertices;

ascertaining a plurality of curvature measures for the first set of surface equations; and

forming a shape equation with the plurality of curvature measures;". The specification

does not describe anywhere what the surface equations are and how they are formed. It also does

not describe the shape equation and how it is formed and used. The specification does not

describe anywhere how the three dimensional shape is determined from the shape equation.

What are the rules used to interpret the values of y_i that are generated to identify the three

dimensional shape?

Claim 14 states in part, "forming a second set of surface equations representative of the

second local sets of points with the associated vertices; and

determining values for the curvature measures for the local sets of points by the surface

equations and applying the values to the shape equation to identify a shape.". The specification

does not describe anywhere what the surface equations are and how they are formed. It also does

not describe the shape equation and how it is formed and used. The specification does not

describe anywhere how the three dimensional shape is determined from the shape equation.

What are the rules used to interpret the values of y_i that are generated to identify the three

dimensional shape?

Claims rejected but not specifically addressed are rejected based on their dependency on

rejected claims.

8.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and
> distinctly claiming the subject matter which the applicant regards as his invention.

9.   Claim 1-7, 10 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Claim 1 recites the limitation " f) determining the variance inflation factor for each of

said curvature measures;". There is insufficient antecedent basis for "the variance inflation

factor" in the claim.

Claim 1 recites the limitation " h) if any variance inflation factor is greater than 10,

sequentially reduce the subset of curvature measures used in multiple linear regression by 1;".

There is insufficient antecedent basis for "the subset of curvature measures" in the claim.

Claim 1 recites the limitation " j) selecting the subset of curvature measures that yields the largest coefficient of regression;". There is insufficient antecedent basis for "the subset of curvature measures" and "the largest coefficient of regression" in the claim.

Claim 1 recites the limitation " 1) inserting the partial coefficients of linear regression into the linear equation generated by multiple linear regression for said curvature subset ". There is insufficient antecedent basis for "the partial coefficients of linear regression" and "the linear equation" in the claim.

Claim 2 recites the limitation " the principal curvature kl; the principal curvature k2; the mean curvature; the Gaussian curvature;". There is insufficient antecedent basis for "the principal curvature kl; the principal curvature k2; the mean curvature; and the Gaussian curvature;" in the claim.

Claim 2 recites the limitation " a ratio of the minimum of the absolute value of the two principal curvatures to the maximum of the absolute values of the two principal curvatures;". There is insufficient antecedent basis for "the minimum of the absolute value" and "the maximum of the absolute values" in the claim.

Claim 2 recites the limitation " the difference between the first principal curvature value and the second principal curvature value;". There is insufficient antecedent basis for "the difference", "the first principal curvature value" and "the second principal curvature value" in the claim.

Claim 2 recites the limitation " the average of the dot product between the first principal curvature vector of a surface vertex and the first principal curvature vector of all vertices on the

3-D triangulated surface immediately connected to this vertex". There is insufficient antecedent

basis for "the average", "the dot product" and "the first principal curvature vector" in the claim.

Claim 2 recites the limitation " the average of the dot product between the second

principal curvature vector of a surface vertex and the second principal curvature vector of all

vertices on the 3D triangulated surface immediately connected to this vertex". There is

insufficient antecedent basis for "the average", "the dot product" and "the second principal

curvature vector" in the claim.

Claim 2 recites the limitation " the difference between the average of the dot product

between the second principal curvature vector of a surface vertex and the second principal

curvature vector of all vertices on the 3D triangulated surface immediately connected to this

vertex and the average of the dot product between the first principal curvature vector of a surface

vertex and the first principal curvature vector of all vertices on the 3D triangulated surface

immediately connected to this vertex". There is insufficient antecedent basis for "the average",

"the dot product", "the second principal curvature vector", and "the first principal curvature

vector" in the claim.

Claim 2 recites the limitations " the radius or diameter of a circle inscribed into the

normal triangle such that the three sides of the normal triangle are tangent to the inscribed circle;

the radius or diameter of a circle circumscribed around the normal triangle such that each

of the three vertices of the normal triangle intersects the perimeter of the circumscribed circle;".

There is insufficient antecedent basis for "the radius", "the normal triangle", and "the perimeter"

in the claim.

Claim 2 recites the limitations " the ratio of the radius or diameter of a circle inscribed into a normal triangle such that the three sides of the normal triangle are tangent to the inscribed circle and the radius or diameter of a circle circumscribed around a normal triangle such that each of the three vertices of the normal triangle intersects the perimeter of the circumscribed circle;

area of the normal triangle;

perimeter of the normal triangle;". There is insufficient antecedent basis for "the ratio", "the radius" and "the normal triangle" in the claim.

Claim 2 recites the limitations " the ratio of the area over perimeter squared of the normal triangle; and

the dot product of the surface triangle normal vector and the normal triangle normal vector". There is insufficient antecedent basis for "the ratio", the area", "the normal triangle", "the dot product", "the surface triangle normal vector" and "the normal triangle normal vector" in the claim.

Claim 6 recites the limitation " b) identifying a first set of regions on the three dimensional structure or structures and assigning a numeric value to said blood vessels;". There is insufficient antecedent basis for "the three dimensional structure or structures" in the claim.

Claim 6 recites the limitation " f) determining the variance inflation factor for each of said curvature measures;". There is insufficient antecedent basis for "the variance inflation factor" in the claim.

Claim 6 recites the limitation " h) if any variance inflation factor is greater than 10,

sequentially reduce the subset of curvature measures used in multiple linear regression by 1;".

There is insufficient antecedent basis for "the subset of curvature measures" in the claim.

Claim 6 recites the limitation " j) selecting the subset of curvature measures that yields

the largest coefficient of regression;". There is insufficient antecedent basis for "the subset of

curvature measures" and "the largest coefficient of regression" in the claim.

Claim 6 recites the limitation " 1) inserting the partial coefficients of linear regression

into the linear equation generated by multiple linear regression for said curvature subset ". There

is insufficient antecedent basis for "the partial coefficients of linear regression" and "the linear

equation" in the claim.

Claim 7 recites the limitation " determining a single scalar value for each vertex on a

structure or structures from the linear equation determined ". There is insufficient antecedent

basis for "the linear equation" in the claim.

Claim 7 recites the limitation " rendering the 3-D structure or structures with said color

values displayed on the surface of the structure or structures ". There is insufficient antecedent

basis for "said color values" and "the surface of the structure or structures" in the claim.

Claim 10 recites the limitation " an average of the dot product between a first principal

curvature vector of a surface vertex and a first principal curvature vector of all vertices on a 3D

triangulated surface immediately connected to the surface vertex". There is insufficient

antecedent basis for "the dot product" in the claim.

Claim 10 recites the limitation " an average of the dot product between a second principal

curvature vector of a second surface vertex and a second principal curvature vector of all vertices

on a 3D triangulated surface immediately connected to the second surface vertex". There is

insufficient antecedent basis for "the dot product" in the claim.

Claim 10 recites the limitation " a difference between the average of the dot product

between the second principal curvature vector of the second surface vertex and the second

principal curvature vector of all vertices on the 3D triangulated surface immediately connected to

the second surface vertex and the average of the dot product between the first principal curvature

vector of the surface vertex and the first principal curvature vector of all vertices on the 3D

triangulated surface immediately connected to the surface vertex". There is insufficient

antecedent basis for "the average" and "the dot product", in the claim.

Claim 13 recites the limitation " an average of the dot product between a first principal

curvature vector of a surface vertex and a first principal curvature vector of all vertices on a 3D

triangulated surface immediately connected to the surface vertex". There is insufficient

antecedent basis for "the dot product" in the claim.

Claim 13 recites the limitation " an average of the dot product between a second principal

curvature vector of a second surface vertex and a second principal curvature vector of all vertices

on a 3D triangulated surface immediately connected to the second surface vertex". There is

insufficient antecedent basis for "the dot product" in the claim.

Claim 13 recites the limitation " a difference between the average of the dot product

between the second principal curvature vector of the second surface vertex and the second

principal curvature vector of all vertices on the 3D triangulated surface immediately connected to

the second surface vertex and the average of the dot product between the first principal curvature

vector of the surface vertex and the first principal curvature vector of all vertices on the 3D

triangulated surface immediately connected to the surface vertex". There is insufficient

antecedent basis for "the average" and "the dot product", in the claim.

Claims rejected but not specifically addressed are rejected based on their dependency on

rejected claims.

10.   Claims 1 and 6 are rejected under 35 U.S.C. § 112, second paragraph, as being

incomplete for omitting essential steps, such omission amounting to a gap between the steps.

See MPEP § 2172.01. The omitted steps are:

Claim 1 states in Line 1, "A method of evaluating determining three dimensional

structures" and in Lines 22-23, "1) inserting the partial coefficients of linear regression into the

linear equation generated by multiple linear regression for said curvature subset.". The equation is

Equation 10, on Page 17 of the specification. But the specification does not specify anywhere

what the dependent variable y is. Is it a measure of the effective curvature or some other variable?

The specification states on Page 17, Lines 16-18, "y_i are the values assigned to the vertices of the

3-D computer models that "teach" multiple linear regression what aneurysms look like". But

what are the y_i values? How are the aneurysms taught from the y_i values?

The claim does not include a step involving how the y_i values are used or interpreted to

determine the three dimensional structures. The specification describes how the individual

curvature measures are used to identify a cylinder, a sphere or a plane on Page 11, Lines 22-23;

on lines 25-26; on Page 12, Lines 5-10; Lines 14-18; Lines 20-22; Page 15, Lines 4-5; Lines 13-

14; Lines 17-19; Page 16, Lines 1-2; Lines 3-5; Lines 7-8; Lines 18-20. However, the use of y_i

values to identify the cylinder, sphere or plane is not included in the claim.

Claim 6 states in Line 1, "A method of evaluating three dimensional renderings of blood

vessels for detecting the presence of aneurysms" and in Lines 21-22, "1) inserting the partial

coefficients of linear regression into the linear equation generated by multiple linear regression for

said curvature subset.". The equation is Equation 10, on Page 17 of the specification. But the

specification does not specify anywhere what the dependent variable y is. Is it a measure of the

effective curvature or some other variable? The specification states on Page 17, Lines 16-18, "y_i

are the values assigned to the vertices of the 3-D computer models that "teach" multiple linear

regression what aneurysms look like". But what are the y_i values? How are the aneurysms taught

from the y_i values?

The claim does not include a step involving how the y_i values are used or interpreted to

determine the three dimensional structures and to detect the presence of aneurysms. The

specification describes how the individual curvature measures are used to identify a cylinder, a

sphere or a plane on Page 11, Lines 22-23; on lines 25-26; on Page 12, Lines 5-10; Lines 14-18;

Lines 20-22; Page 15, Lines 4-5; Lines 13-14; Lines 17-19; Page 16, Lines 1-2; Lines 3-5; Lines

7-8; Lines 18-20. However, the use of y_i values to identify the cylinder, sphere or plane or

aneurysms is not included in the claim.

Claim Rejections - 35 USC § 102

11.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

12.   Claims 8, 9, 11, 12, 14 and 15 are rejected under 35 U.S.C. § 102(e) as being anticipated

by **Kitamura et al.** (U.S. Patent 5,936,628).

12.1   **Kitamura et al.** teaches Three dimensional model processing method, and apparatus.

Specifically, as per claim 8, **Kitamura et al.** teaches method of determining a three dimensional

shape (Fig. 3a and 3b; CL9, L65 to CL10, L46), comprising:

        obtaining a first set of points (CL2, L58-60);

        identifying local sets of points with associated vertices from the first set of points (CL2,

L63-65; CL4, L6-13);

        forming surface equations representative of the local sets of points with the associated

vertices (CL6, L30-34; CL10, L11-14); and

        ascertaining a plurality of curvature measures for the surface equations (CL10, L14-23),

to identify a shape (Fig. 10a; CL7, L34-35; CL10, L23-26).

Per Claim 9: **Kitamura et al.** teaches that the surface equations are bivariate quadratic

equations (CL6, L30-34; CL13, L51-53).

12.2   As per claim 11, **Kitamura et al.** teaches method of determining a shape (Fig. 3a and 3b;

CL9, L65 to CL10, L46), comprising:

obtaining a first set of points (CL2, L58-60);

identifying a first predetermined number of local sets of points with associated vertices

from the first set of points (CL2, L63-65; CL4, L6-13);

forming a first set of surface equations representative of the first local sets of points with

the associated vertices (CL6, L30-34; CL10, L11-14);

ascertaining a plurality of curvature measures for the first set of surface equations (CL10,

L14-23); and

forming a shape equation with the plurality of curvature measures (Fig. 10a; CL7, L34-

35; CL10, L23-26).

Per Claim 12: **Kitamura et al.** teaches that the first set of surface equations are bivariate

quadratic equations (CL6, L30-34; CL13, L51-53).

12.3   As per claim 14, **Kitamura et al.** teaches obtaining a second set of points (CL2, L58-60);

identifying a second predetermined number of local sets of points with associated vertices

from the second set of points (CL2, L63-65; CL4, L6-13);

forming a second set of surface equations representative of the second local sets of points

with the associated vertices (CL6, L30-34; CL10, L11-14);

determining values for the curvature measures for the local sets of points by the surface

equations (CL10, L14-23); and

applying the values to the shape equation to identify a shape (Fig. 10a; CL7, L34-35;

CL10, L23-26).

Per Claim 15: **Kitamura et al.** teaches that the second set of surface equations are

bivariate quadratic equations (CL6, L30-34; CL13, L51-53).

Conclusion

13.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is

571-272-3717. The examiner can normally be reached on Monday through Friday from

8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Leo Picard, can be reached on 571-272-3749. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
October 28, 2005

Paul P. Rodriguez   10/31/05
Primary Examiner
Art Unit 2125